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Identification of Pan-African accretionary orogeny along the Zhenghe-Dapu fault zone in the Cathaysia Block, South China

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A Neoproterozoic subduction-accretion complex have been identified along the Zhenghe-Dapu fault (ZDF) zone in the inner Cathaysia Block, South China. The serpentinites are characterized by low 187Os/188Os ratios of 0.11621 to 0.12008 and very low 187Re/188Os values of 0.031-0.129, which are similar to those from highly refractory mantle residues, indicating that they are tectonic rather than igneous origin. The meta-ultramafic rocks, including pyroxene hornblende schist and hornblende schist, are characterized by high Ni, Cr and low K2O content. Their convex upward REE partterns, along with lower concentrations of highly incompatible elements indicate that their protolith were cumulate origin. Low initial 87Sr/86Sr and high 143Nd/144Nd ratios suggest that they were derived from partial melting of an depleted mantle source. Low Nb/Yb, Th/Yb and Ti/V imply they have IAT-like geochemical features which occurred in oceanic island arc setting. The associated metasedimentary rocks have low chemical index of alteration (CIA) values (34.7-58.2) and relatively high index of compositional variability (ICV) values (0.98-3.22) suggested weak chemical weathering and an immature source. Low $K2O/Al2O_3$ (0.01-0.03), low zirconδ18O values (4.4 to 5.3‰ and high zircon Hf (t) values (+13.5 to +16) of the metasedimentary rocks point to mantle-derived material supply for their protolith. TDM1 (616-719 Ma) of the zircons reflect the source material was derived from a mantle source with Neoproterozoic model ages. Low La/Sc and Th/Sc values infer that their source material were derived from an ocean island arc setting.
These rocks have experienced strong mylonitization. Shear-sense indicators show that the mylonitized rocks experienced sinistral strike-slip motion parallel to the ZDF zone. Metamorphic zircons from the mylonitized rocks yield SIMS U-Pb age of ca.522-520 Ma, suggesting that the subduction-accretion complex experienced intensive Pan-African metamorphic event. All these features prefer that there was a Pan-African accretionary orogeny in the South China Block. The ZDF zone probably marks the collisional belt between the west Cathaysia Block and the west Australia, corresponding to the assembly of the Gondwanaland.